

甘冒奇險

Dicing With Danger

Get a peek at the life on and above a toxic fire urchin.

一探栖居在毒火焰海胆上的小生命。

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Sea urchins are never the most popular critters in the sea. The first time you discover one, it's usually a nanosecond after you've put your foot down and the needle sharp spines have inserted themselves under your skin. Undiluted agony is quickly followed by a variety of urban myths on the best way to remove the broken spines. Peeing on your foot is always suggested as is vinegar, lemon juice and hot water. At least you get to laugh at the stories other people come up with.

However, imagine the extra dose of ouch-factor when you learn that certain sea urchins also harbour venom in their spines. One of the most impressive members of the urchin family is the fire urchin; not only is it incredibly beautiful but it's incredibly toxic. For divers, it is one of the most fascinating creatures in the sea. Scientifically known as *Asthenosoma varium*, this particular urchin is particularly curious, as the rather hazardous little bundle is also host to a group of smaller creatures that are less able to defend themselves. The fire urchin has five specific house guests all living with it in varying degrees of harmony.

The Host

It's the physical structure of the fire urchin that makes it so attractive to its hitchhiking friends. There are around 800 different sea urchins that come in varying shapes and sizes but there are just two types of fire urchin, *Asthenosoma varium* and *Asthenosoma ijimai*. These are only found in tropical and subtropical waters

and usually on sandy, rubble strewn sea beds. They grow to about 23cm across and have a flattened dome shaped body with a flexible soft skeleton, which collapses out of water. Fire urchins are covered in needle sharp spines interspersed with dozens of tiny jaws that snap shut on their prey.

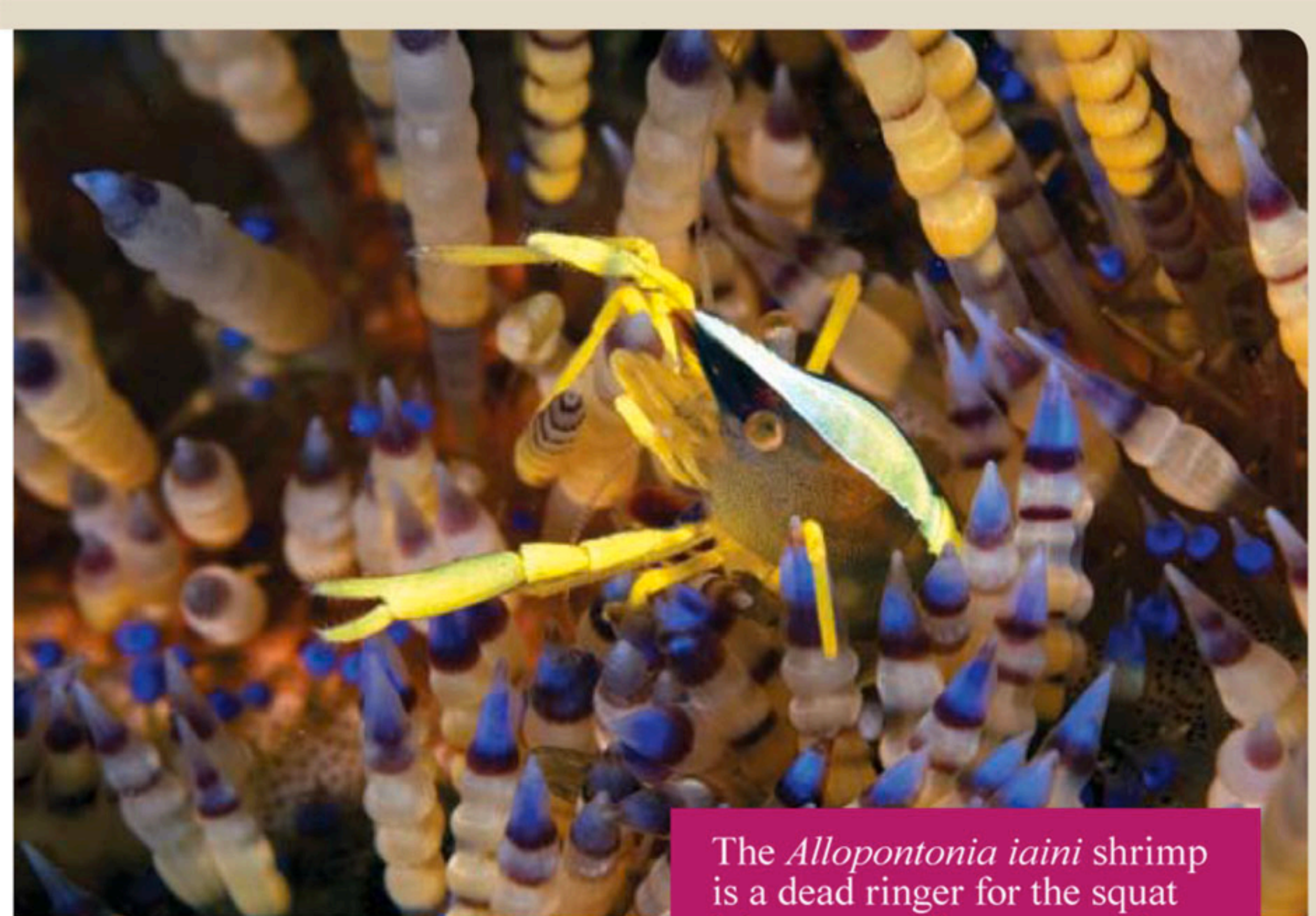
Each spine is beautifully striped in tones of red, yellow, blue and white and just below the tip is a rounded bump that houses a poison. Should you be unlucky enough to touch one, the pain can last from 15 minutes to several hours. Some reports state that it can take a week to regain full use a limb, while web searches will quote that this is one of the deadliest animals in the ocean and has been known to cause human deaths. There is no anti-venom, so it's worth thinking twice before touching one.

The House Guests

Although the toxic venom in fire urchin spines attacks the nervous system, paralyzing its victim, the *Asthenia varium* is the favored form of housing for five diminutive and often hard-to-spot critters.

Coleman's Shrimp

The first time we saw one of these amazing crustaceans was on the cover of a book. The first time we saw it ourselves was one of those moments indelibly stamped into our memories. It was in



The *Allopontonia iaini* shrimp is a dead ringer for the squat lobsters usually seen nestling inside a crinoid.

海胆从来都不是海洋中最受欢迎的小动物。当你第一次发现它的时候，通常已经是在你一脚踩上它，而它如针般尖锐的棘刺刺穿你皮肤的转瞬间。快速地随着强烈的痛楚而来的，会是各种道听涂说的最佳断刺移除法。在你的脚上撒尿是最常听到的建议，此外还有用醋、柠檬汁和热水擦拭，但不管如何，人们说出的各种故事情节都足以逗得你哈哈大笑。

然而，当你知道某些海胆的棘刺内还存在著毒液时，你可以想像一下这些额外剂量的疼痛因子会让人有多痛苦。海胆家族中最令人印象深刻的成员之一是火焰海胆，这不仅是因为它们的美丽无以伦比，也是因为它们的毒性十分惊人。对于潜水员而言，它们是海中最迷人的生物之一。这种特殊的海胆在学术上的名称为 *Asthenosoma varium*，它们非常地稀奇古怪，因为这种相当危险的小生物还寄宿著一群不太能自我保卫的更小型动物。火焰海胆有五种特定的寄宿客，各以不同的和谐度与之共存。

宿主

火焰海胆之所以如此吸引这些搭乘便车的朋友，主要是因为它们的身体结构。海胆的种类大约有800多种，各有不同的形状和大小，但是火焰海胆就只有两种，分别是 *Asthenosoma varium* 和 *Asthenosoma ijimai*。这些火焰海胆只存在于热带和亚热带水域，通常是在碎

石散布的沙质海床上。它们的宽度大约可长到23厘米，平坦圆顶形的身体具有可伸缩的柔软骨架，会因为缺乏水分而塌陷。火焰海胆全身布满如针般尖锐的棘刺，散布著许多小小的颚片，可以快速咬合以捕捉猎物。

火焰海胆的每一根棘刺都有著红、黄、蓝、白色调的美丽条纹，并且在棘刺尖端的正下方有一个含有毒液的圆形隆起物。万一运气不好碰触到这块隆起物，疼痛会持续15分钟到数小时之久。有一些研究报告显示，中毒的肢体要完全恢复功能可能需要一个星期的时间，而网路搜索引擎可找到许多事例证明火焰海胆是海洋中最致命的动物之一，而且已经证实有致人于死的案例。由于没有抗毒血清可以解毒，所以在碰触之前最好三思。

寄宿客

虽然在火焰海胆棘刺内的毒液会破坏神经系统，瘫痪它们的受害者，但这种 *Asthenia varium* 是五种通常难以察觉的微小动物最喜欢寄宿的种类。

科尔曼虾

我们第一次看到这种神奇的甲壳类动物是在一本书的封面上，而



Futuristic looking zebra crabs have specially adapted legs with tiny hooks ensuring a safe ride on the fire urchin.

未来感十足的斑马蟹长著为了此种特殊生活型态量身打造的脚，它们能确保斑马蟹在火焰海胆上行得安全。

Indonesia and the dive site was smothered with fire urchins. After staring at what seemed like hundreds, we finally spotted a Coleman's shrimp. It was nestling on a patch of skin, surrounded by a ring of spines like a military fortification. The shrimp would have cleared this patch yet does so without causing any substantial damage to the urchin. *Periclimenes colemani* is usually found in mating pairs with the female being the larger. They live exclusively on fire urchins and can wander across their surface without being harmed.

Zebra Crabs

Another guest of the fire urchin is the futuristic looking, dark brown and white striped, *Zebrida Adamsii*. Unlike the relationship between the Coleman pair and the urchin, zebra crabs are sometimes found on other species. These are an inch or so across their carapace and are mostly seen travelling solo. They have specially adapted legs, where the last segment forms tiny hooks that ensure them a safe ride. They don't appear to do any harm to the urchin, but use the spines for shelter and no doubt find themselves an easy meal as the urchin feeds on the tiny organic particles and detritus trapped in the sand.

我们第一次亲眼看到它的那一刻，已深印在我们不可磨灭的记忆中。那是在印尼一个覆盖著满满火焰海胆的潜点。在我们目不转睛看了大概有数百只的火焰海胆之后，终于发现了一只科尔曼虾。它安身在火焰海胆的一小片表皮上，四周环绕著一圈像军事要塞的棘刺。科尔曼虾会清理这一片皮肤，但不会对海胆造成任何重大的损伤。这种虾子（又称高文岩虾；学名 *Periclimenes colemani*）通常与体积较大的雌性成对出现，它们只栖居在火焰海胆上，并且可以在火焰海胆的表面上漫游而不会受到伤害。

斑马蟹

火焰海胆的另一个寄宿客，深褐色和白色条纹相间、未来感十足的斑马蟹。不同于成对的科尔曼虾和海胆之间的关系，斑马蟹有时候也会出现在其他的物种上。这些斑马蟹的甲壳长约一英寸左右，大多是单独行动。它们拥有为了此种特殊生活型态量身打造的脚，在脚的最后一节形成小钩，可以确保它们的旅程平安。显然的，它们并没有对海胆造成任何伤害，只是以棘刺作为庇护之所，而且毫无疑问的，当海胆食用那些困在沙中的微小有机颗粒和碎屑时，也让它们得以不费吹灰之力地饱餐一顿。

Urchin Cardinalfish

Fire urchins are generally nocturnal, spending the day hiding in cracks and crevices in the reef. However, investigating sandy patches at depth can reveal whole colonies out and grazing. When that happens, peering at one – from a safe distance – might reveal a cluster of fish sheltering around the base. These tiny fish are part of the cardinalfish family and are found on long-spined diadema urchins as well as fire urchins. The reason for this relationship isn't really clear but you can safely assume that the 20mm long adult fish gains substantial protection from their host, while the urchin gains nothing for its hospitality.

Wentletrap Snails

This tiny white-shelled snail is the only one of the five hitchhikers that is parasitic. Beneath its body, the fire urchin has tube shaped feet that are important to feeding, movement and clinging on to hard surfaces. However, these miniature feet come under attack from colonies of the equally small snail, *Luetzenia asthenosomae*. Their bodies have a reduced tongue in favor of a protruding trunk and this adaptation allows them to feed on the urchin by nibbling at the tubular feet and external soft tissues.

Commensal Shrimp

After many years of searching for the fifth fire urchin resident, we finally found this little guy in Myanmar. His almond shaped body and pointed head are marked by a single white stripe, which successfully camouflages him among the spines. At first glance the *Allopontonia iaini* shrimp is a dead ringer for the squat lobsters you see sheltering in the arms of a crinoid. Completely protected by the urchin, he lives on its base where the mouth is located. No doubt he scavenges the scraps from meals and has no affect on the urchin at all.

It seems that the old saying 'location, location, location' is especially relevant for the house guests of toxic fire urchins. It may take some time to spot these regular residents, as they seem to come and go according to the seasons. There is little research on that subject and almost none on what other creatures may also take advantage of hitchhiking on a fire urchin – we recently spotted a tiny cuttlefish retreating to one for extra security. And despite its armor plated defense system, it seems the toxic fire urchin has little choice in the matter as these symbiotic critters regularly hop on for the ride and stay for the duration.

变色管天竺鲷

火焰海胆通常是昼伏夜出，白天躲藏在珊瑚礁的裂缝和缝隙之中；然而，仔细审查深水中的几片小沙地，就可以看到整个火焰海胆群落跑出来牧食。当这种情况出现的时候，如果你紧盯著一只火焰海胆——在一段安全的距离之外——可能可以在底部附近看到一群寻求庇护的鱼。这些微小的鱼类是天竺鲷家族的成员，可以在长棘冠刺海胆和火焰海胆身上发现它们的踪迹。虽然人们不是很清楚这种关系形成的原因，但是可以安全地假设，这些20毫米长的成鱼得到了它们宿主的大力保护，不过，海胆的热情好客却没有得到任何的回报。

海狮螺

在火焰海胆的五种寄宿客中，这种微小的白壳蜗牛是唯一的寄生者。在火焰海胆的身体下方有管状脚，它们对于火焰海胆的觅食、移动和紧抓坚硬表面非常重要。然而，这些细微的小脚却遭受到这种同样小型的蜗牛（学名 *Luetzenia asthenosomae*）的集群攻击。海狮螺的身体有一个退化的舌头，这对于突出的躯干非常有利，而这种适应性的改变，让它们能够藉由啃食海胆的管足和外部软组织维生。

共生虾

经过多年搜索火焰海胆的第五种寄宿客，我们终于在缅甸找到了这个小家伙。共生虾的杏仁状身体和尖尖的头部有一道的白色条纹记号，让它们可以成功地在火焰海胆的棘刺中伪装自己。第一眼乍看之下，学名为 *Allopontonia iaini* 的共生虾十分酷似你在海百合腕足中所看到那些寻求庇护的铠甲虾。共生虾受到海胆的全面保护，它们栖居在海胆嘴部所在的底部。毫无疑问地，它们以海胆的食物碎屑为食，却对海胆没有丝毫的影响。

俗语说的：「位置，位置，位置。」似乎对于毒火焰海胆的寄宿客而言，有特别重大的意义。如果你要找到这些寄宿客，可能需要花上一些时间，因为它们似乎是根据季节来来去去。有关这个议题的研究不多，而且几乎没有其他生物和它们一样，是从栖居在火焰海胆上获得好处——但我们最近发现了一只极小的乌贼退避在一只火焰海胆上，寻求额外的安全防卫。尽管毒火焰海胆拥有一身的装甲防御系统，但是，对于这些共生的小动物经常跳到它们的身上，不管是要搭便车还是长期停留，它们似乎都别无选择。

Scientific Classification

Kingdom: **Animalia**
Phylum: **Echinodermata**
Class: **Echinoidea**
Subclass: **Euechinoidea**
Superorder: **Diadematacea**
Order: **Diadematoida**
Family: **Diadematidae**
Species: ***A. radiata***